Guest editorial Preface

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Induction on the Semantic Web[1]

The Semantic Web is increasingly populated with instance data, nowadays often in the form of Linked Data. Consequently, machine learning and other instance driven approaches are of increasing relevance. In this special issue we have collected various inductive approaches and approaches from relational learning for solving a number of tasks. In particular, inductive methods are applied to learn the definition of ontological concepts, for the support of ontology construction and for the continuous support of ontology evolution.

The paper by Nicola Fanizzi presents DL-FOIL for ontology construction by learning concept descriptions in Description Logics. DL-FOIL is an extension to the well known ILP algorithm FOIL and is applied to ontologies from eBanking, bioinformatics and characters and places mentioned in the New Testament. A particular challenge is that in the open world assumption (OWA) used here there are instances that are neither positive nor negative examples for the concept under consideration and, thus, specific performance measures are introduced and discussed.

The paper by Luca Cagliero, Tania Cerquitelli, and Paolo Garza is on the semi-automatic ontology construction by exploiting functional dependencies and association rules. The approach supports domain experts in the construction of meaningful Description Logic ontologies. Functional dependencies are first identified to infer a schema ontology graph (SOnG) that represents conceptual relationships between attributes. Subsequently, the dependency-driven ontology generator (DOnG) framework analyzes XML content to discover schema ontology instance graphs (SOnIG) exploiting the association rules holding between data items. The experimental evaluation focuses on the semi-automatic generation of ontologies from XML data, a research area that deserves further research attention.

The paper by Maryam Ramezani discusses similarity-based approaches to assist users in the continuous development of ontologies. The paper presents a method for learning new relationships from an existing concept hierarchy with the goal of assisting the user in placing a newly added concept in a concept hierarchy. Semantic relations are learned from an existing ontology or concept hierarchy. This approach is experimentally evaluated on the development of ontologies in social semantic bookmarking, semantic wiki and can be beneficial in other Web 2.0 style semantic applications as well.

The paper by Francesca A. Lisi is part of this special issue but will appear in the next volume. The paper presents AL-QuIn, an Onto-Relational Learning System for Semantic Web Mining. It produces descriptions of a given relational database at multiple granularity levels. The approach is implemented and tested and the functionalities of the system are illustrated using relational data extracted from the on-line CIA World Fact Book.

We believe that the papers are representative for the current state of the art in the field. We express our sincere gratitude to all contributing authors and reviewers for their time and effort. We hope that the presented papers will help encourage new work and publications in this upcoming research area of growing practical importance.

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[1] The published version is available at: http://www.igi-global.com/bookstore/titledetails.aspx?titleid=47837&detailstype=contents